

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A refractory liner for a vessel comprising:  
a generally cylindrical metal shell having a dome;  
5 a refractory liner having a cylindrical portion spaced inwardly from said shell and a dome portion spaced inwardly from the dome of said shell, said refractory liner being sized to provide an expansion gap between said liner and said shell; and a selectively crushable material positioned in said gap, said material having a predetermined yield stress that will provide controlled resistance to expansion of said  
10 refractory shell resulting from the chemical growth of said liner, said material extending along the entire height of the shell and the liner.
2. The apparatus of Claim 1, wherein said yield stress ranges from 0.5 to 4.0 MPa.
3. The apparatus of Claim 1, wherein said yield stress ranges from 1.0 to  
15 3.0 MPa.
4. The apparatus of Claim 1, wherein said yield stress ranges from 1.5 to 2.5 MPa.
5. A refractory liner for a vessel comprising:  
a generally cylindrical metal shell having a dome;  
20 a refractory liner having a cylindrical portion spaced inwardly from said shell and a dome portion spaced inwardly from the dome of said shell, said refractory liner being sized to provide an expansion gap between said liner and said shell; and a selectively crushable material positioned in said gap, said material having a predetermined yield stress that will provide controlled resistance to expansion of said  
25 refractory shell resulting from the chemical growth of said liner, wherein said crushable material comprises and crushable metal foam.
6. The apparatus of Claim 5, wherein said foam comprises an alloy of iron, chromium, aluminum and yttrium.